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Vertical nutrient and trace element migration in cambisoils after application of residues from anaerobic digestion of pig manure

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Cambisols sampled in alpine pastures were packed into soil columns in order to monitor downward migration of nutrient and trace elements, applied within the residue from anaerobic digestion of a pig manure. 2 rain events per week were simulated. The manure added substantial amounts of K, ammonium, Na, Ca, P, S, Cl, B, Zn and Cu to the soil, whereas Mg, Mn, Ni, Cr, Pb, Cd and V were at the same level. In the eluates, total elemental composition as well as nitrate and ammonium were monitored. Addition of soluble Fe (at 1000 mg/l as FeCl3) decreased the release of soluble sulphate, but had no significant effect on the release of Fe and P. During subsequent rain events, exchangeable K remained enriched in the topsoil, wheras total sulfur moved to deeper layers. After 8 weeks, the columns were dismantled and analyzed for quasi-total and mobile fractions. Both in topsoils and subsoils, manure addition finally increased soil pH in case of low P soils, but decreased soil pH in case of high pH soils.
Effects of manure applications on groundwater formation processes will be discussed.